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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/989,770	11/20/2001	Jack Oon Chu	YOR919980460US2	2335

7590

07/03/2003

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EXAMINER

RICHARDS, N DREW

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 07/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/989,770

Applicant(s)

CHU ET AL.

Examiner

N. Drew Richards

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 42-72 is/are pending in the application.
- 4a) Of the above claim(s) 42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 44, 49, 51-54, 56, 59, 61, 65 and 72 is/are rejected.
- 7) ☒ Claim(s) 43-71 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 May 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 43-72 in Paper No. 8 is acknowledged. Claim 42 has been withdrawn from further consideration as being directed towards a non-elected invention.

Specification

2. Claims 1-41 were cancelled by pre-amendment. However, a duplicate claim 22 is in the specification between claims 56 and 57. This second claim 22 has also been also cancelled by the pre-amendment.

Claim Objections

3. Claims 43, 46-48, 51, 55, 58, 60, 63, 68 and 69 are objected to because of the following informalities:

Claim 43 lines 7 and 8 both recite "f epitaxially" where they should read "epitaxially."

Claim 46 line 1 should read "said step of forming **said** sixth layer" as the sixth layer has previously been claimed.

Claim 47 line 3 should read "said second layer **having** a thickness" instead of "is to having a thickness" as written.

Claim 48 lines 5 and 6 both recite "f epitaxially" where they should read "epitaxially."

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Claim 51 line 1 should read "said step of forming **said** sixth layer" as the sixth layer has previously been claimed. Line 2 should read "content w within."

Claim 55 line 8 recites "f epitaxially" where it should read "epitaxially."

Claim 58 line 1 should read "said step of forming **said** third layer" as the third layer has previously been claimed.

Claim 60 line 8 recites "f epitaxially" where it should read "epitaxially."

Claim 63 line 1 should read "said step of forming **said** third layer" as the third layer has previously been claimed.

Claim 68 is objected to as depending from a cancelled claim. Claim 68 depends from claim 1 which was previously cancelled.

Claim 69 line 5 recites "dielectric f on" where it should read "dielectric on."
Appropriate correction is required.

4. Claims 44-47, 49-54, 56-59, 61-67, and 69-71 are objected to as containing the same informalities as the independent claims they depend from.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 44 recites the limitation "the strain relief structure" in line 2. There is insufficient antecedent basis for this limitation in the claim.

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7. Claim 49 recites the limitation "the strain relief structure" in line 2. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 52 recites the limitations "the spacer thickness" in line 2 and "the supply dose" in line 3. There is insufficient antecedent basis for these limitations in the claim.

9. Claim 53 recites the limitation "said second layer of p-doped $\text{Si}_{1-x}\text{Ge}_x$ layer" in line 1. There is insufficient antecedent basis for this limitation in the claim.

10. Claim 54 recites the limitations "the supply layer" in line 1 and "the channel region" in line 2. There is insufficient antecedent basis for these limitations in the claim.

11. Claim 56 recites the limitation "the strain relief structure" in line 2. There is insufficient antecedent basis for this limitation in the claim.

12. Claim 59 recites the limitation "the supply layer" in line 1. There is insufficient antecedent basis for this limitation in the claim.

13. Claim 61 recites the limitation "the strain relief structure" in line 2. There is insufficient antecedent basis for this limitation in the claim.

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14. Claim 72 recites the limitation "the relaxed structure" in line 6. There is insufficient antecedent basis for this limitation in the claim.

15. Claims 51 and 65 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 51 recites grading the Ge content within the fifth layer in the step of forming the sixth layer. It is indefinite how the amount of Ge in the fifth layer can be graded while forming the sixth layer as the fifth layer will have already been formed.

Claim 65 claims a layered structure. Claim 65 depends from claim 60 which claims a method for forming transistors. Claim 65 is indefinite as it is not clear whether a device (layered structure) or method is being claimed. Further, it is an improper depend claim as it is not drawn towards the same statutory subject matter as the claim it depends from.

Claim Rejections - 35 USC § 102

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

17. Claim 72 is rejected under 35 U.S.C. 102(b) as being anticipated by Ismail et al. (U.S. Patent No. 5,534,713).

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Ismail et al. disclose forming a single crystalline substrate 20, forming a first layer (including layers 34, 36, 38, 32, 40, 30 as shown in figure 2) of relaxed (layer 34 is relaxed) $\text{Si}_{1-x}\text{Ge}_x$ formed epitaxially on the substrate where Ge fraction x is in the range from 0.35 to 0.5, forming an over-shoot layer (portion of 30), $\text{Si}_{1-y}\text{Ge}_y$ within the first layer having a Ge fraction y , where $y=x+z$ and z is in the range from 0.01 to 0.1, and having a thickness less than its critical thickness with respect to the top of the first layer, and forming a second layer of $\text{Si}_{1-x}\text{Ge}_x$ (42 as shown in figure 2) formed epitaxially on the first layer.

Though shown in figure 2 as $x=0.3$, x is disclosed in the range from 0.35 to 0.5 on column 2 lines 31-37.

Though overshoot layer 30 is shown in figure 2 as $y=0.8$, y is disclosed in as $x+z$ where z is in the range of from 0.01 to 0.1 on column 6 lines 34-41. This portion of the specification discloses the Ge content being graded from .75 to .5 going upward through the layer. Thus, the overshoot layer can be considered the segment of layer 30 having Ge content of 0.5 to 0.6. Since this segment of the layer will only comprise a portion of total thickness of layer 30, this segment is formed below the critical thickness with respect to the top of the first layer.

Allowable Subject Matter

18. Claims 43, 45-48, 50, 55, 57, 58, 60, 62-64, and 66-71 are objected to as containing minor informalities as discussed in sections 3 and 4 above, but would be allowable if rewritten to correct the deficiencies noted.

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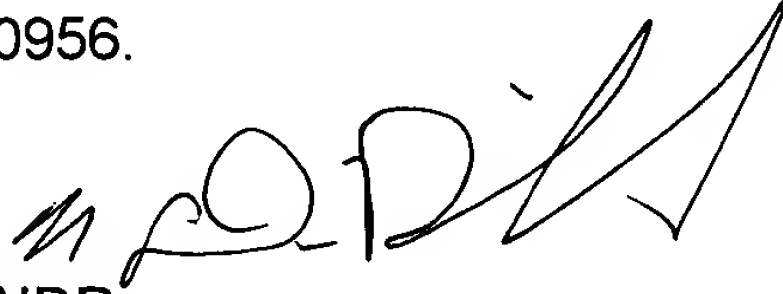
19. The following is a statement of reasons for the indication of allowable subject matter: Prior art of record fails to teach, disclose, or suggest, either alone or in combination, a method for forming p-channel field effect transistors as claimed including forming a first layer of relaxed $\text{Si}_{1-x}\text{Ge}_x$ epitaxially on a substrate where x is from 0.35 to 0.5 and forming a layer of Ge epitaxially over the first layer where the layer of Ge is under compressive strain and has a thickness less than its critical thickness with respect to the first layer.

Conclusion

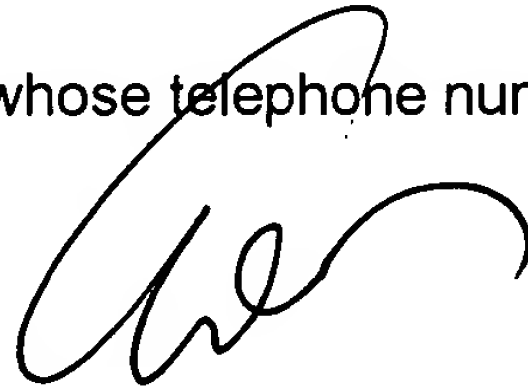
Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (703) 306-5946. The examiner can normally be reached on M-F 8:00-5:30; Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



NDR
June 26, 2003



EDDIE LEE
SUPERVISORY PATENT EXAMINER
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